

# Veritas™ Dynamic Multi-Pathing Release Notes

Linux

6.0.1

# Veritas™ Dynamic Multi-Pathing Release Notes

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- Product release level

- Hardware information
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- Operating system
- Version and patch level
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- Problem description:
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  - Troubleshooting that was performed before contacting Symantec
  - Recent software configuration changes and network changes

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<https://sort.symantec.com/documents>

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<http://www.symantec.com/connect/storage-management>

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Europe, Middle-East, and Africa [semea@symantec.com](mailto:semea@symantec.com)

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# Dynamic Multi-Pathing Release Notes

This document includes the following topics:

- [About this document](#)
- [About Veritas Dynamic Multi-Pathing \(DMP\)](#)
- [About Symantec Operations Readiness Tools](#)
- [Important release information](#)
- [Changes introduced in 6.0.1](#)
- [System requirements](#)
- [Fixed issues](#)
- [Known issues](#)
- [Software limitations](#)
- [Documentation](#)

## About this document

This document provides important information about Veritas Dynamic Multi-Pathing (DMP) version 6.0.1 for Linux. Review this entire document before you install or upgrade DMP.

The information in the Release Notes supersedes the information provided in the product documents for DMP.

This is "Document version: 6.0.1 Rev 0" of the *Veritas Dynamic Multi-Pathing Release Notes*. Before you start, make sure that you are using the latest version of this guide. The latest product documentation is available on the Symantec Web site at:

<https://sort.symantec.com/documents>

## About Veritas Dynamic Multi-Pathing (DMP)

Veritas Dynamic Multi-Pathing (DMP) provides multi-pathing functionality for the operating system native devices configured on the system. DMP creates DMP metadevices (also known as DMP nodes) to represent all the device paths to the same physical LUN.

DMP is also available as a stand-alone product, which extends DMP metadevices to support the OS native logical volume manager (LVM). You can create LVM volumes and volume groups on DMP metadevices.

Veritas Dynamic Multi-Pathing can be licensed separately from Storage Foundation products. Veritas Volume Manager and Veritas File System functionality is not provided with a DMP license.

DMP functionality is available with a Storage Foundation (SF) Enterprise license, a SF HA Enterprise license, and a Storage Foundation Standard license.

Veritas Volume Manager (VxVM) volumes and disk groups can co-exist with LVM volumes and volume groups, but each device can only support one of the types. If a disk has a VxVM label, then the disk is not available to LVM. Similarly, if a disk is in use by LVM, then the disk is not available to VxVM.

## About Symantec Operations Readiness Tools

[Symantec Operations Readiness Tools \(SORT\)](#) is a Web site that automates and simplifies some of the most time-consuming administrative tasks. SORT helps you manage your datacenter more efficiently and get the most out of your Symantec products.

SORT can help you do the following:



- |   |  |
|---|--|
| Prepare for your next installation or upgrade | <ul style="list-style-type: none"><li>■ List product installation and upgrade requirements, including operating system versions, memory, disk space, and architecture.</li><li>■ Analyze systems to determine if they are ready to install or upgrade Symantec products.</li><li>■ Download the latest patches, documentation, and high availability agents from a central repository.</li><li>■ Access up-to-date compatibility lists for hardware, software, databases, and operating systems.</li></ul> |
| Manage risks                                  | <ul style="list-style-type: none"><li>■ Get automatic email notifications about changes to patches, array-specific modules (ASLs/APMs/DDIs/DDLs), and high availability agents from a central repository.</li><li>■ Identify and mitigate system and environmental risks.</li><li>■ Display descriptions and solutions for hundreds of Symantec error codes.</li></ul>   |
| Improve efficiency                            | <ul style="list-style-type: none"><li>■ Find and download patches based on product version and platform.</li><li>■ List installed Symantec products and license keys.</li><li>■ Tune and optimize your environment.</li></ul>  |

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**Note:** Certain features of SORT are not available for all products. Access to SORT is available at no extra cost.

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To access SORT, go to:

<https://sort.symantec.com>

## Important release information

- For important updates regarding this release, review the Late-Breaking News TechNote on the Symantec Technical Support website:  
<http://www.symantec.com/docs/TECH164885>
- For the latest patches available for this release, go to:  
<https://sort.symantec.com/>
- The hardware compatibility list contains information about supported hardware and is updated regularly. For the latest information on supported hardware visit the following URL:  
<http://www.symantec.com/docs/TECH170013>

Before installing or upgrading Storage Foundation and High Availability Solutions products, review the current compatibility list to confirm the compatibility of your hardware and software.

## Changes introduced in 6.0.1

This section lists the changes in Veritas Dynamic Multi-Pathing 6.0.1.

### New versioning process for SFHA Solutions products

Symantec made some changes to simplify the versioning process to ensure that customers have a unified experience when it comes to deploying our different products across Storage, Availability, Backup, Archiving and Enterprise Security products. With this change, all the products will have a 3 digit version. In complying with this approach, the current SFHA Solutions release is available as version 6.0.1.

### New directory location for the documentation on the software media

The PDF files of the product documentation are now located in the `/docs` directory on the software media. Within the `/docs` directory are subdirectories for each of the bundled products, which contain the documentation specific to that product. The `sfha_solutions` directory contains documentation that applies to all products.

### Dynamic Reconfiguration tool

Dynamic Multi-Pathing provides a Dynamic Reconfiguration tool. The Dynamic Reconfiguration tool is an interactive tool to automate dynamic reconfiguration of LUNs or HBAs. Dynamic reconfiguration includes addition, removal or replacement of LUNs, and replacement of certain HBAs, without requiring a reboot. The Dynamic Reconfiguration tool simplifies the process, so that you do not need a complex set of DMP and operating system related commands.

### Enhanced support for Fusion-io iodrive and iodrive2

In this release, support for Fusion-io iodrive and iodrive2 is enhanced to support TRIM operations. TRIM operations erase unused blocks of data to improve SSD performance. The future writes on the Fusion-io cards are more efficient.

The DMP components, Veritas File System (VxFS) and Veritas Volume Manager (VxVM), use the TRIM operations to free up the blocks that do not contain valid data. The TRIM capability is similar to thin reclamation, and is performed with the same commands.

DMP supports the TRIM operation for Fusion-io devices for Red Hat Linux 6.0 (RHEL6) and SUSE Linux Enterprise Server 11 (SLES11).

## Changes in supported Linux virtualization technologies

Veritas Storage Foundation and High Availability (SFHA) Solutions 6.0.1 products support the following virtualization technologies in Linux environments:

- Kernel-based Virtual Machine (KVM) technology for Red Hat Enterprise Linux (RHEL)
- Kernel-based Virtual Machine (KVM) technology for SUSE Linux Enterprise Server (SLES)

SFHA Solutions products provide the following functionality for KVM guest virtual machines:

- Storage visibility
- Storage management
- High availability
- Cluster failover
- Replication support

**Table 1-1** SFHA Solutions supported configurations in guest and host for KVM technologies

Objective	Recommended SFHA Solutions product configuration	KVM technology
Storage visibility for KVM guest virtual machines	Dynamic Multi-Pathing (DMP) in the KVM guest virtual machines	RHEL SLES
Storage visibility for KVM hosts	DMP in the KVM hosts	RHEL SLES
Storage management features and replication support for KVM guest virtual machines	Storage Foundation (SF) in the KVM guest virtual machines	RHEL SLES
Advanced storage management features and replication support for KVM hosts	Storage Foundation Cluster File System (SFCFSHA) in the KVM hosts	RHEL SLES

**Table 1-1** SFHA Solutions supported configurations in guest and host for KVM technologies (*continued*)

Objective	Recommended SFHA Solutions product configuration	KVM technology
End-to-end storage visibility in KVM hosts and guest virtual machines	DMP in the KVM host and guest virtual machines	RHEL SLES
Storage management features and replication support in the KVM guest virtual machines and storage visibility in in the KVM host	DMP in the KVM host and SF in the KVM guest virtual machines	RHEL SLES
Application monitoring and availability for KVM guest virtual machines	Symantec ApplicationHA in the KVM guest virtual machines	RHEL
Virtual machine monitoring and failover for KVM hosts	Veritas Cluster Server (VCS) in the KVM hosts	RHEL SLES
Application failover for KVM guest virtual machines	VCS in the KVM guest virtual machines	RHEL SLES
Application availability and virtual machine availability	Symantec Application HA in the KVM guest virtual machines and VCS in the KVM host	RHEL
Application failover across KVM guest virtual machines and physical hosts	VCS in KVM guest virtual machines and KVM physical host machines	RHEL SLES

VCS provides virtual to virtual (in-guest) clustering support for the following Linux virtualization environments:

- Red Hat Enterprise Virtualization (RHEV)
- Microsoft Hyper-V
- Oracle Virtual Machine (OVM)

For VMware support, see *Veritas Storage Foundation in a VMware ESX Environment*.

For implementation details:

See the *Veritas Storage Foundation™ and High Availability Solutions Virtualization Guide for Linux*.

## Changes related to installation and upgrades

The product installer includes the following changes in 6.0.1.

### Locally-installed installation and uninstallation scripts now include the release version

When you run local scripts (`/opt/VRTS/install`) to configure Veritas products, the names of the installed scripts now include the release version.

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**Note:** If you install your Veritas product from the install media, continue to run the `installdmp` command without including the release version.

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To run the script from the installed binaries, run the `installdmp<version>` command.

Where `<version>` is the current release version with no periods or spaces.

For example, to configure the 6.0.1 version of your product, run this command:

```
# /opt/VRTS/install/installdmp601 -configure
```

### Support for tunables file templates

You can use the installer to create a tunables file template. If you start the installer with the `-tunables` option, you see a list of all supported tunables, and the location of the tunables file template.

### Additional installation postcheck options

The `postcheck` option has been enhanced to include additional checks.

You can use the installer's post-check option to perform the following checks:

- General checks for all products.
- Checks for Volume Manager (VM).
- Checks for File System (FS).
- Checks for Cluster File System (CFS).

# System requirements

This section describes the system requirements for this release.

## Hardware compatibility list

The compatibility list contains information about supported hardware and is updated regularly. For the latest information on supported hardware go to the following URL:

<http://www.symantec.com/docs/TECH170013>

## Supported Linux operating systems

This section lists the supported operating systems for this release of Veritas products.

[Table 1-2](#) shows the supported operating systems for this release.

**Table 1-2** Supported operating systems

Operating systems	Levels	Kernel version	Chipsets
Red Hat Enterprise Linux 6	Update 2, 3	2.6.32-220.el6 2.6.32-279.el6	64-bit x86, EMT*/Opteron 4.1 64-bit only
Red Hat Enterprise Linux 5	Update 5, 6, 7, 8	2.6.18-194.el5 2.6.18-238.el5 2.6.18-274.el5 2.6.18-308.el5	64-bit x86, EMT*/Opteron 4.1 64-bit only
SUSE Linux Enterprise 11	SP1, SP2	2.6.32.12-0.7.1 3.0.13-0.27.1	64-bit x86, EMT*/Opteron 4.1 64-bit only
SUSE Linux Enterprise 10	SP4	2.6.16.60-0.85.1	64-bit x86, EMT*/Opteron 4.1 64-bit only
Oracle Linux 6	**6.2, 6.3	2.6.32-220.el6 2.6.32-279.el6	64-bit x86, EMT*/Opteron

**Table 1-2** Supported operating systems (*continued*)

Operating systems	Levels	Kernel version	Chipsets
Oracle Linux 5	**Update 5, 6, 7, 8	2.6.18-194.el5 2.6.18-238.el5 2.6.18-274.el5 2.6.18-308.el5	64-bit x86, EMT*/Opteron

\* Extended Memory Technology

\*\* RHEL-compatible mode only.

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**Note:** Only 64-bit operating systems are supported.

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If your system is running an older version of either Red Hat Enterprise Linux, SUSE Linux Enterprise Server, or Oracle Linux, upgrade it before attempting to install the Veritas software. Consult the Red Hat, SUSE, or Oracle documentation for more information on upgrading or reinstalling your operating system.

Symantec supports only Oracle, Red Hat, and SUSE distributed kernel binaries.

Symantec products operate on subsequent kernel and patch releases provided the operating systems maintain kernel Application Binary Interface (ABI) compatibility.

## Fixed issues

This section covers the incidents that are fixed in this release.

### Installation and upgrades fixed issues

This section describes the incidents that are fixed related to installation and upgrades in this release.

**Table 1-3** Fixed issues related to installation and upgrades

Incident	Description
2585899	On RHEL, unable to create storage for OCR and Vote disk when using FQDN instead of using only the node name.
2526709	DMP-OSN tunable value not get persistence after upgrade from 5.1SP1 to 6.0.

**Table 1-3** Fixed issues related to installation and upgrades (*continued*)

Incident	Description
2088827	During product migration the installer overestimates disk space use.

## Dynamic Multi-Pathing fixed issues

This section describes the incidents that are fixed for Dynamic Multi-Pathing in this release.

**Table 1-4** Veritas Dynamic Multi-Pathing fixed issues

Incident	Description
2826958	pwwn no is not displayed in the output of command "vxddmpadm list dmpnode dmpnodename=".
2818840	Enhance the vxddmprow utility to support permission and root:non-system ownership be set and make it persistent.
2794625	Unable to configure ASM to use DMP native block device path.
2792242	I/O hang after performing zone remove/add operations.
2743926	DMP restored fails to restart during system boot in 6.0.
2729501	exclude path not working properly and can cause system hang while coming up after enabling native support.
2700086	EMC BCV (NR) established devices are resulting in multiple dmp events messages (paths being disabled/enabled).
2652485	Inactive snapshot luns cause trespassing.
2626199	vxddmpadm list dmpnode printing incorrect path-type.
2564092	[VxVM][Usability]Automate the lun provisioning (addition) / removal steps using vxddiskadm /or new VxVM CLI command.
2556467	DMP-ASM: disable all paths and reboot host cause /etc/vx/vxddmprowdev records losing.

## Known issues

This section covers the known issues in this release.



## Changes in enclosure attributes are not persistent after an upgrade to VxVM 6.0.1 (2082414)

The Veritas Volume Manager (VxVM) 6.0.1 includes several array names that differ from the array names in releases prior to release 5.1SP1. Therefore, if you upgrade from a previous release to VxVM 6.0.1, changes in the enclosure attributes may not remain persistent. Any enclosure attribute set for these arrays may be reset to the default value after an upgrade to VxVM 6.0.1. Manually reconfigure the enclosure attributes to resolve the issue.

Table 1-5 shows the Hitachi arrays that have new array names.

**Table 1-5** Hitachi arrays with new array names

Previous name	New name
TagmaStore-USP	Hitachi_USP
TagmaStore-NSC	Hitachi_NSC
TagmaStoreUSPV	Hitachi_USP-V
TagmaStoreUSPVM	Hitachi_USP-VM
<New Addition>	Hitachi_R700
Hitachi AMS2300 Series arrays	New array names are based on the Model Number 8x. For example, AMS_100, AMS_2100, AMS_2300, AMS_2500, etc.

In addition, the Array Support Library (ASL) for the enclosures XIV and 3PAR now converts the cabinet serial number that is reported from Hex to Decimal, to correspond with the value shown on the GUI. Because the cabinet serial number has changed, any enclosure attribute set for these arrays may be reset to the default value after an upgrade to VxVM 6.0.1. Manually reconfigure the enclosure attributes to resolve the issue.

The cabinet serial numbers are changed for the following enclosures:

- IBM XIV Series arrays
- 3PAR arrays

## DMP disables subpaths and initiates failover when an iSCSI link is failed and recovered within 5 seconds. (2100039)

When using iSCSI S/W initiator with an EMC CLARiiON array, iSCSI connection errors may cause DMP to disable subpaths and initiate failover. This situation occurs when an iSCSI link is failed and recovered within 5 seconds.

### **Workaround:**

When using iSCSI S/W initiator with an EMC CLARiiON array, set the `node.session.timeo.replacement_timeout` iSCSI tunable value to 40 secs or higher.

## DMP marks the subpaths as DISABLED while these subpaths are accessible from OS level (2037222)

For iSCSI devices on SLES 10 SP3, the DMP tunable parameter `dmp_fast_recovery` needs to be turned off.

```
# vxdmppadm settune dmp_fast_recovery=off
```

## DMP panics if a DDL device discovery is initiated immediately after loss of connectivity to the storage (2040929)

When using EMC Powerpath with VxVM 5.1SP1 on SLES11, set the `fast_io_fail_tmo` on the HBA port to any non-zero value that is less than the `dev_loss_tmo` value so as to avoid a panic in case a DDL device discovery is initiated by the `vxdisk scandisks` command or the `vxctl enable` command immediately after loss of connectivity to the storage.

## Upgrading the Linux kernel when the root volume is under DMP control

This section includes the procedures for upgrading the Linux kernel when the root volume is under DMP control.

Linux kernel can be upgraded on RHEL5 systems without turning off the DMP native support. Only one reboot is required to bring system LVM volume on DMP after kernel upgrade.

### To update the kernel on a RHEL5 system

- 1 Update kernel with the rpm command.

```
# rpm -ivh kernel_rpm
```

- 2 Turn on the dmp\_native\_support tunable:

```
# vxdmpadm settune dmp_native_support=on
```

This enables booting with new kernel with LVM devices with DMP.

- 3 Reboot.

On SLES10 or SLES11

On SLES, the kernel can not be upgraded in a single reboot due to limitation in mkinitrd command.

### To update the kernel on a SLES10 or SLES11 system

- 1 Turn off DMP native support

```
# vxdmpadm settune dmp_native_support=off
```

- 2 Reboot the system.

- 3 Upgrade kernel using the rpm command

```
# rpm -ivh kernel_rpm
```

- 4 Turn on DMP native support.

```
# vxdmpadm settune dmp_native_support=on
```

- 5 Reboot the system to bring the root LVM volume under DMP control.

## Adding a DMP device or its OS device path as a foreign disk is not supported (2062230)

When DMP native support is enable, adding a DMP device or its OS device path as a foreign disk using the `vxdldadm addforeign` command is not supported. Using this command can lead to unexplained behavior.

## Turning off the DMP native support does not reset the preferred\_names field in lvm.conf to the original values (2421823)

When you turn off the native support, the preferred\_names field in lvm.conf is not reset to the original value. LVM does not function correctly with Device Mapper Volumes.

**Workaround:** Manually edit the lvm.conf file, and then Run `vgscan` command

## After rebooting the array controller for CX4-240-APF array, I/O errors occur on shared file systems (2616315)

For Linux hosts, rebooting the array controller for a CX4-240-APF array may result in I/O errors on shared file systems.

**Workaround:**

**To work around this issue**

- ◆ Set the tunable parameter `dmp_lun_retry_timeout` to 120 seconds before rebooting the array controller.

```
# vxdmpadm settune dmp_lun_retry_timeout=120
```

## Continuous trespass loop when a Clariion LUN is mapped to a different host than its snapshot (2761567)

If a Clariion LUN is mapped to a different host than its snapshot, a trespass on one of them could cause a trespass on the other. This behavior could result in a loop for these LUNs, as DMP tries to fail back the LUNs if the primary paths are available.

**Workaround**

To avoid this issue, turn off the `dmp_monitor_ownership` tunable:

```
# vxdmpadm settune dmp_monitor_ownership=off
```

## Installation known issues

This section describes the known issues during installation and upgrade.

### Error messages in syslog (1630188)

If you install or uninstall a product on a node, you may see the following warnings in syslog: `/var/log/message`. These warnings are harmless and can be ignored.

```
Jul  6 10:58:50 swlx62 setroubleshoot: SELinux is preventing the
semanage from using potentially mislabeled files
(/var/tmp/installer-200907061052eVe/install.swlx62.VRTSvxvm). For
complete SELinux messages. run sealert -l ed8978d1-0b1b-4c5b-a086-
67da2a651fb3
Jul  6 10:58:54 swlx62 setroubleshoot: SELinux is preventing the
semanage from using potentially mislabeled files
(/var/tmp/installer-200907061052eVe/install.swlx62.VRTSvxvm). For
complete SELinux messages. run sealert -l ed8978d1-0b1b-4c5b-a086-
67da2a651fb3
Jul  6 10:58:59 swlx62 setroubleshoot: SELinux is preventing the
restorecon from using potentially mislabeled files
```

## Web installer does not ask for authentication after the first session if the browser is still open (2509330)

If you install or configure DMP and then close the Web installer, if you have other browser windows open, the Web installer does not ask for authentication in the subsequent sessions. Since there is no option to log out of the Web installer, the session remains open as long as the browser is open on the system.

**Workaround:** Make sure that all browser windows are closed to end the browser session and subsequently log in again.

## Stopping the Web installer causes Device Busy error messages (2633924)

If you start the Web installer, and then perform an operation (such as prechecking, configuring, or uninstalling), you may get an error message saying the device is busy.

**Workaround:** Do one of the following:

- Kill the start.pl process.
- Start the webinstaller again. On the first Web page you see that the session is still active. Either take over this session and finish it or terminate it directly.

## The uninstaller does not remove all scripts (2696033)

After removing DMP, some of the RC scripts remain in the `/etc/rc*.d/` folder. This is due to an issue with the `chkconfig` rpm in RHEL6 and updates. You can manually remove the scripts from the `/etc/rc*.d/` folder after removing the VxVM packages.

Workaround:

Install the `chkconfig-1.3.49.3-1 chkconfig rpm` from the RedHat portal. Refer to the following links:

<http://grokbase.com/t/centos/centos/117pfhe4zz/centos-6-0-chkconfig-strange-behavior>

<http://rhn.redhat.com/errata/RHBA-2012-0415.html>

### **Installing DMP with a keyless license or DMP-only license does not enable DMP native support for LVM root volumes (2874810)**

When you install DMP with a keyless license or DMP-only license, the tunable parameter `dmp_native_support` is set to on. However, the DMP native support is not enabled for LVM root volumes. The DMP native support is enabled for non-root LVM volumes.

#### **Workaround:**

After package installation, use the following command to enable the DMP support for root LVM volumes.

```
# vxddmpadm settune dmp_native_support=on
```

Then reboot the system.

### **Perl module error on completion of DMP installation (2879417)**

When you install, configure, or uninstall DMP, the installer prompts you to optionally upload installation logs to the Symantec Web site. If the installer encounters connectivity problems, you may see an error similar to the following:

```
Status read failed: Connection reset by peer at  
<media_path>/../perl/lib/5.14.2/Net/HTTP/Methods.pm line 269.
```

#### **Workaround:**

Ignore this error. It is harmless.

## **In some cases with large LUN setup, the storage disappears after DMP device scan (2828328)**

This issue is typically seen on a large LUN setup. In some cases, the storage disappears after the DMP device scan. The DMP device scan is generated with the `vxdisk scandisks` command or the `vxctl enable` command. Even if the the OS command `ioscan` can discover devices, VxVM/DMP cannot.

#### **Workaround:**

Restarting the `vxconfigd` daemon on the affected node may resolve the issue. If that does not work, you must reboot the system.

## Software limitations

This section covers the software limitations of this release.

See the corresponding Release Notes for a complete list of software limitations related to that component or product.

See “[Documentation](#)” on page 24.

### DMP behavior on Linux SLES11 when connectivity to a path is lost (2049371)

On SLES 11, when the connectivity to a path is lost, the SLES 11 kernel removes the device path from its database. DMP reacts to the UDEV event that is raised in this process, and marks the device path as DISABLED[M]. DMP will not use the path for further I/Os. Unlike on other flavours of Linux, the path state is DISABLED[M] instead of DISABLED. Subsequently, if the path comes back online, DMP responds to the UDEV event to signal the addition of device path into SLES 11 kernel. DMP enables the path and changes its state to ENABLED.

### DMP settings for NetApp storage attached environment

To minimize the path restoration window and maximize high availability in the NetApp storage attached environment, set the following DMP tunables:

**Table 1-6**

Parameter name	Definition	New value	Default value
dmp_restore_interval	DMP restore daemon cycle	60 seconds.	300 seconds.
dmp_path_age	DMP path aging tunable	120 seconds.	300 seconds.

The change is persistent across reboots.

### To change the tunable parameters

- 1 Issue the following commands:

```
# vxdmpadm settune dmp_restore_interval=60  
  
# vxdmpadm settune dmp_path_age=120
```

- 2 To verify the new settings, use the following commands:

```
# vxdmpadm gettune dmp_restore_interval  
  
# vxdmpadm gettune dmp_path_age
```

## LVM volume group in unusable state if last path is excluded from DMP (1976620)

When a DMP device is used by a native LVM volume group, do not exclude the last path to the device. This can put the LVM volume group in an unusable state.

## DMP does not support devices in the same enclosure that are configured in different modes (2643506)

DMP does not support the configuration where two devices in the same enclosure are configured in different modes. For example, if one device is configured as ALUA and another one is configured as Active/Passive (A/P).

## Documentation

Product guides are available in the PDF format on the software media in the `/docs/product_name` directory. Additional documentation is available online.

Make sure that you are using the current version of documentation. The document version appears on page 2 of each guide. The publication date appears on the title page of each document. The latest product documentation is available on the Symantec website.

<http://sort.symantec.com/documents>

## Documentation set

Table 1-7 lists the documentation for Veritas Dynamic Multi-Pathing.



**Table 1-7** Veritas Dynamic Multi-Pathing documentation

Document title	File name
<i>Veritas Dynamic Multi-Pathing Release Notes</i>	dmp_notes_601_lin.pdf
<i>Veritas Dynamic Multi-Pathing Installation Guide</i>	dmp_install_601_lin.pdf
<i>Veritas Dynamic Multi-Pathing Administrator's Guide</i>	dmp_admin_601_lin.pdf

If you use Veritas Operations Manager (VOM) to manage Veritas Storage Foundation and High Availability products, refer to the VOM product documentation at:

<http://sort.symantec.com/documents>

## Manual pages

The manual pages for Veritas Storage Foundation and High Availability Solutions products are installed in the `/opt/VRTS/man` directory.

Set the `MANPATH` environment variable so the `man(1)` command can point to the Veritas Storage Foundation manual pages:

- For the Bourne or Korn shell (`sh` or `ksh`), enter the following commands:

```
MANPATH=$MANPATH:/opt/VRTS/man
export MANPATH
```

- For C shell (`csh` or `tcsh`), enter the following command:

```
setenv MANPATH ${MANPATH}:/opt/VRTS/man
```

See the `man(1)` manual page.

Manual pages are divided into sections 1, 1M, 3N, 4, and 4M. Edit the `man(1)` configuration file `/etc/man.config` to view these pages.

### To edit the man(1) configuration file

- 1 If you use the man command to access manual pages, set `LC_ALL` to “C” in your shell to ensure that the pages are displayed correctly.

```
export LC_ALL=C
```

See incident 82099 on the Red Hat Linux support website for more information.

- 2 Add the following line to `/etc/man.config`:

```
MANPATH /opt/VRTS/man
```

where other man paths are specified in the configuration file.

- 3 Add new section numbers. Change the line:

```
MANSECT          1:8:2:3:4:5:6:7:9:tcl:n:l:p:o
```

to

```
MANSECT          1:8:2:3:4:5:6:7:9:tcl:n:l:p:o:3n:1m
```